

An Approach to Software Product Line Acquisition Planning

Army Product Line Workshop
Orlando, Florida
12 February 2009

Larry Jones
Research, Technology and Systems
Solutions Program

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213



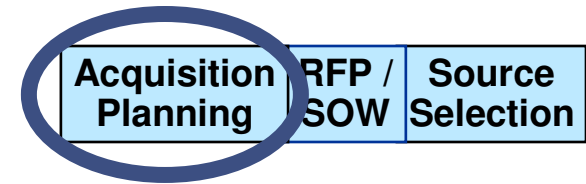
Software Engineering Institute

Carnegie Mellon

© 2009 Carnegie Mellon University

| Report Documentation Page | | | | Form Approved OMB No. 0704-0188 | |
|--|------------------------------------|-------------------------------------|---|---|---------------------------------|
| Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. | | | | | |
| 1. REPORT DATE 12 FEB 2009 | | 2. REPORT TYPE | | 3. DATES COVERED 00-00-2009 to 00-00-2009 | |
| 4. TITLE AND SUBTITLE An Approach to Software Product Line Acquisition Planning | | | | 5a. CONTRACT NUMBER | |
| | | | | 5b. GRANT NUMBER | |
| | | | | 5c. PROGRAM ELEMENT NUMBER | |
| 6. AUTHOR(S) | | | | 5d. PROJECT NUMBER | |
| | | | | 5e. TASK NUMBER | |
| | | | | 5f. WORK UNIT NUMBER | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Carnegie Mellon University,Software Engineering Institute,Pittsburgh,PA,15213 | | | | 8. PERFORMING ORGANIZATION REPORT NUMBER | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | | | | 10. SPONSOR/MONITOR'S ACRONYM(S) | |
| | | | | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) | |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited | | | | | |
| 13. SUPPLEMENTARY NOTES | | | | | |
| 14. ABSTRACT | | | | | |
| 15. SUBJECT TERMS | | | | | |
| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT Same as Report (SAR) | 18. NUMBER OF PAGES 24 | 19a. NAME OF RESPONSIBLE PERSON |
| a. REPORT unclassified | b. ABSTRACT unclassified | c. THIS PAGE unclassified | | | |

What is the Problem?



All too often acquisition planning is short-changed.

- The downstream consequences are often painful.

In a software product line (SPL) the acquisition considerations are different than “usual”.

- an SPL acquisition can
 - be more complex
 - involve more stakeholders

If more attention is given to planning, acquisition risk can be reduced.

We have found that a good way to start this planning is by holding an *Acquisition Planning Workshop*.



Agenda



Workshop overview

Some details and examples

Conclusion



Acquisition Planning Workshop - Purpose

Why hold a workshop?

1. To be *proactive* in acquisition planning and RFP preparation when it can make a difference.
2. To provide a *structured technical interchange* for key acquisition *stakeholders* to understand the program's acquisition approach and current status, and *explore* potential ways for *reducing software acquisition risk*.

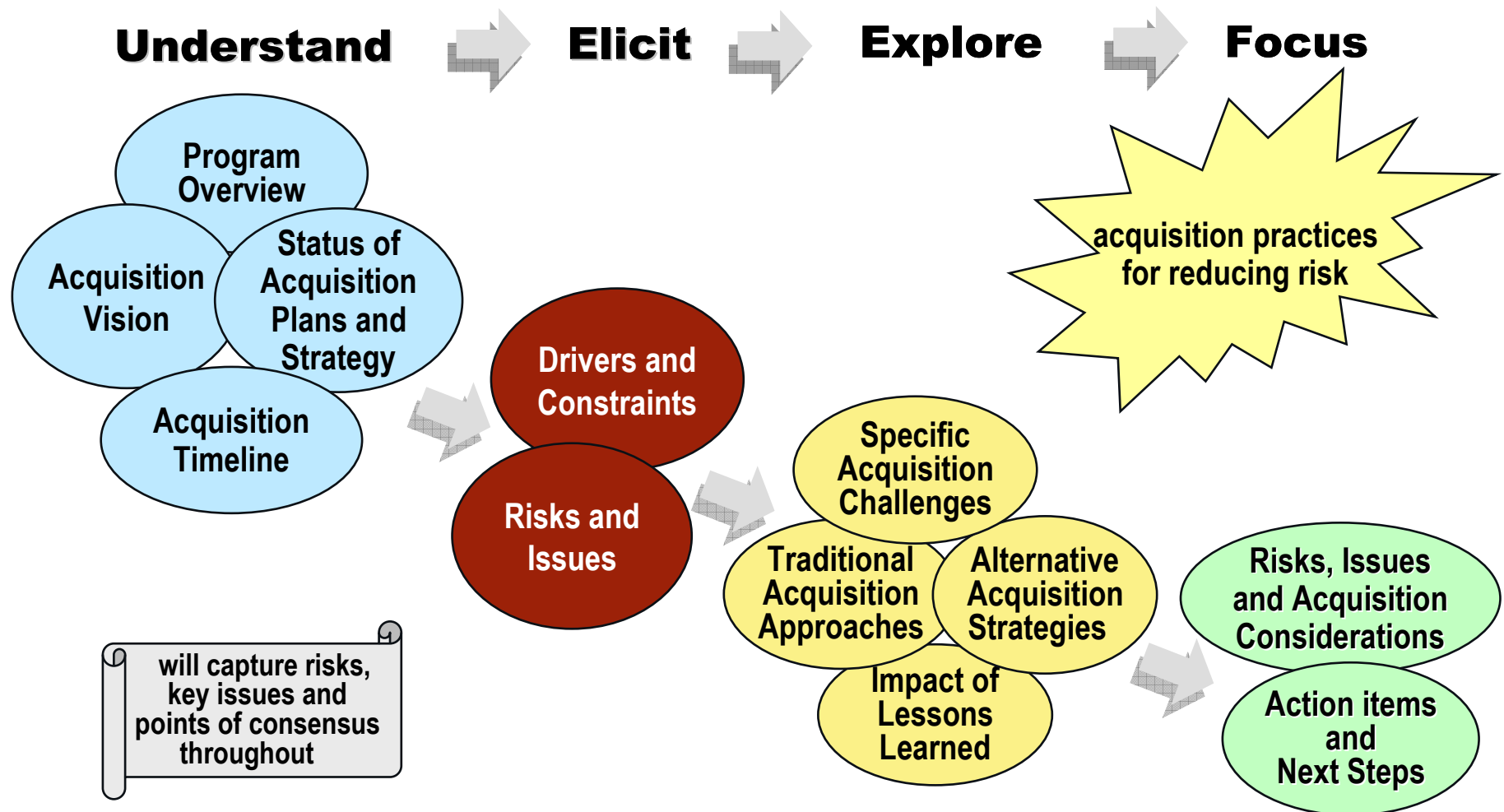
The workshop is most effective when tailored to the organization.

The workshop typically lasts 1 or 1 ½ days.

We'll present a general approach with tailored examples interlaced.



Overview of Acquisition Planning Workshop



Sample Workshop Agenda - 1

| Time | Topic | Responsibility |
|-----------|---|------------------|
| 0800-0830 | 1. Welcome & Introductions | SEI/PO |
| 0830-0900 | 2. System overview and product line vision | PO |
| 0900-0915 | 3. Overview of acquisition organization and stakeholders | PO |
| 0915-0930 | 4. Acquisition lifecycle – program status | PO |
| 0930-1000 | 5. Elicitation of acquisition drivers, constraints and issues | SEI Facilitation |
| 1000-1015 | Break | |
| 1015-1045 | 6. Basic product line acquisition approaches | SEI |
| 1045-1100 | 7. Overview of system acquisition challenges | SEI |
| 1100-1200 | 8. Elaboration* of Challenge #1 | SEI Facilitation |
| 1200-1300 | Lunch | PO |
| 1300-1400 | 9. Elaboration* of Challenge #2 | SEI Facilitation |
| 1400-1500 | 10. Elaboration* of Challenge #3 | SEI facilitation |
| 1500-1515 | Break | |
| 1515-1615 | 11. Elaboration* of Challenge #4 | SEI Facilitation |
| 1615-1700 | 12. Review and Next Steps | SEI Facilitation |

* Includes capture of risks, key issues, action items, and points of consensus



Sample Workshop Agenda –2

If necessary the workshop could extend into a second day to

- address additional challenges
- review previous discussions in light of lessons learned
- explore alternative acquisition strategies
- plan the next steps more thoroughly
- begin to address action items



Agenda

Workshop overview

▶ ***Some details and examples***

Conclusion



Agenda Item 2 – System Overview and Product Line Vision

The PM/Acquisition Organization provides

- A summary statement of the mission need with some elaboration of the important aspects
- A system *context diagram* (black box view) showing
 - system concept
 - all the actors that interface with the system
 - primary and secondary actors
 - key system input and output artifacts
- a system block diagram (white box view)
- the product line vision
 - high-level scope, ownership, future



Agenda Item 3 – Overview of Acquisition Organization and Stakeholders

The PM/Acquisition Organization summarizes

- The program management and acquisition organization showing:
 - organizational chart for acquisition organization
 - all the organizations that are (or will be) involved and key stakeholders
 - prime and supporting contractors
 - the organizations represented at the workshop
- Other key stakeholders and relationships (e.g., other services)
- Who's doing what -- overview of roles & responsibilities (e.g., IPT's)
- Working relationships envisioned for product deployment and life cycle support



Agenda Item 4 – Acquisition Lifecycle – Program Status

The PM/Acquisition Organization summarizes

- Status of the program in relation to the regulatory life cycle milestones that have completed
 - acquisition management documents that have been completed
 - approvals that have been obtained
- Major activities that are currently in progress
- Where the program is in the RFP planning and preparation cycle
- Any acquisition planning risk areas that need to be addressed



Agenda Item 5 – Elicitation of acquisition drivers, constraints and issues

Sources of drivers and constraints



Types of drivers and constraints

- business
- management
- programmatic
- mission
- technical
- system qualities
- software considerations
- political
- cultural
- contractual
- legal



Example Drivers and Constraints - 1

Example *Externally-imposed* Drivers and Constraints

- Joint service program
- Imposed schedule compression
- Cost plus contract
- Standard desktop configuration
- SOSCOE compatibility
- Stringent interoperability requirements

Example Drivers and Constraints *Adopted* by the Acquisition Organization

- RFI to industry <day.month.year>
- RFP release <day.month.year>
- Competitive down select and contractor teaming encouraged
- Incentive award fee
- Use of CORBA middleware



Example Drivers and Constraints - 2

Example Drivers and Constraints *Imposed by Other Stakeholders*

- Flight certification
- Multi-level security
- Backward software compatibility with legacy systems



Agenda Item 6 – Basic Product Line Acquisition Approaches

Referring to presentation by John Bergey, the three approaches are

- Commission a government organization to develop the product line.
- Commission a supplier to develop the product line.
- Commission a supplier to develop products using its own product line.

It is useful to consider this as pre-work prior to the workshop.

If it hasn't been considered yet, this will be a fundamental decision.



Agenda Item 7 – Overview of Acquisition Challenges

Pre-work is definitely called for to adequately prepare for this step.

- The SEI works with the PM to develop a set of key challenges.

These challenges serve as a focal point for identifying risks, issues, decisions and actions.

Example: An existing product line effort will serve as the basis for a new competitive acquisition for a follow-on family of systems.

A set of key challenges for this situation could be

- How to support on-going product development and sustainment
- How to take possession of and transition existing assets for future use
- How to initiate the new competitive acquisition
- How to manage the overall program office commitments



Agenda Items 8-11 – Discussion of Acquisition Challenges

Again, pre-work is very useful to create a set of questions to guide the discussion and stimulate thought for each acquisition challenge.

Example discussion questions for the challenge “*How to support on-going product development and sustainment*”

- What is the scheduled life-time for currently deployed systems? What support will be necessary during this period? Is a phase-out planned?
- Are there dependencies between this sustainment and the new acquisition?
- How long is the current contract in effect? Is an extension necessary to provide continuity of support? Should the scope of work be reduced (e.g., just focus on critical fixes)?

Example discussion questions for “How to take possession of and transition existing assets for future use”

- Have we validated the government data rights?
- Do we have an inventory of transitionable assets? Is additional effort necessary to package the assets?
- Do we have the necessary training materials?



Discussion of Acquisition Challenges

If a set of specific tailored questions has not been identified prior to the workshop, consider these basic questions

- What needs to be done?
- When will it have to be done?
- Who will be responsible for doing it?
- Where are the unknowns?
- What will be difficult about different approaches?
- What is realistic in terms of effort and time?
- What constrains our work?
- How do we make sure the work is done satisfactorily?
- How can we avoid past problems?

As the discussion proceeds, a scribe records risks, issues, decisions and actions.



Example Risks and Issues

- There is no common understanding of the scope of the effort.
- The way the approach is currently planned, the government will be thrust into the role of system integrator.
- The schedule is unrealistic in <these areas>.
- We need to determine if we will run a competitive down-select.
- The envisioned acquisition approach is likely to result in a family of “clone-and-own” products rather than a product line
- The Request for Information needs to be more fully developed.
- The program office does not have sufficient staff to accomplish the tasks we have identified.
- There is a gap between what the current contractor is obliged to deliver and what is needed for subsequent life cycle support.
- Non-functional (i.e., quality) requirements are inadequately understood.



Agenda Item 11 – Review and Next Steps

Review

- risks and issues and decisions
 - create additional actions to priority items
- review action items
 - clarify and assign responsibilities

Plan next steps



Agenda

Workshop overview

Some details and examples

▶ ***Conclusion***



SEI Experience with the Approach

We have gotten positive feedback on the workshops we have conducted so far.

- Improved identification of stakeholders
- Improved communication among acquisition stakeholders
- Improved understanding of acquisition risks
- Better basis for a successful acquisition



Questions



Contact Information

Larry Jones

Senior Member of the Technical Staff
Research, Technology, and Systems
Solutions Program

Telephone: +1 719 548-4744

Email: lgj@sei.cmu.edu

U.S. mail:

Software Engineering Institute
1155 Kelly Johnson Blvd., Suite 111
Colorado Springs
Colorado 80921

World Wide Web:

www.sei.cmu.edu

www.sei.cmu.edu/contact.html

Customer Relations

Email: customer-relations@sei.cmu.edu

Telephone: +1 412-268-5800

SEI Phone: +1 412-268-5800

SEI Fax: +1 412-268-6257

